

EOS Production Sites Network Performance Report: April 2013

This is a monthly summary of EOS network performance testing between production sites -- comparing the measured performance against the requirements. **Significant improvements are noted in Green, Network problems in Red, System problems and Requirements issues in Gold, Issues in Orange, and other comments in Blue.**

Highlights:

- **Mostly stable flows**
 - **GPA ↑ 3.58** (was 3.55 last month).
- **Requirements:** from the Network Requirements Database
- **LaRC ASDC Outflow:** No change: **very high congestion continued to reduce performance on most outflows.** (Not observed from LaRC ANGe or LaRC-PTH)
- **3 flows below Good:**
 - RSS → GHRC: **Adequate**
 - GSFC → EROS: **Adequate**
 - LaRC ASDC → JPL: **Adequate**

Ratings Changes:

Upgrades: ↑

- RSS → GHRC: **Almost Adequate** → **Adequate**

Downgrades: ↓ None

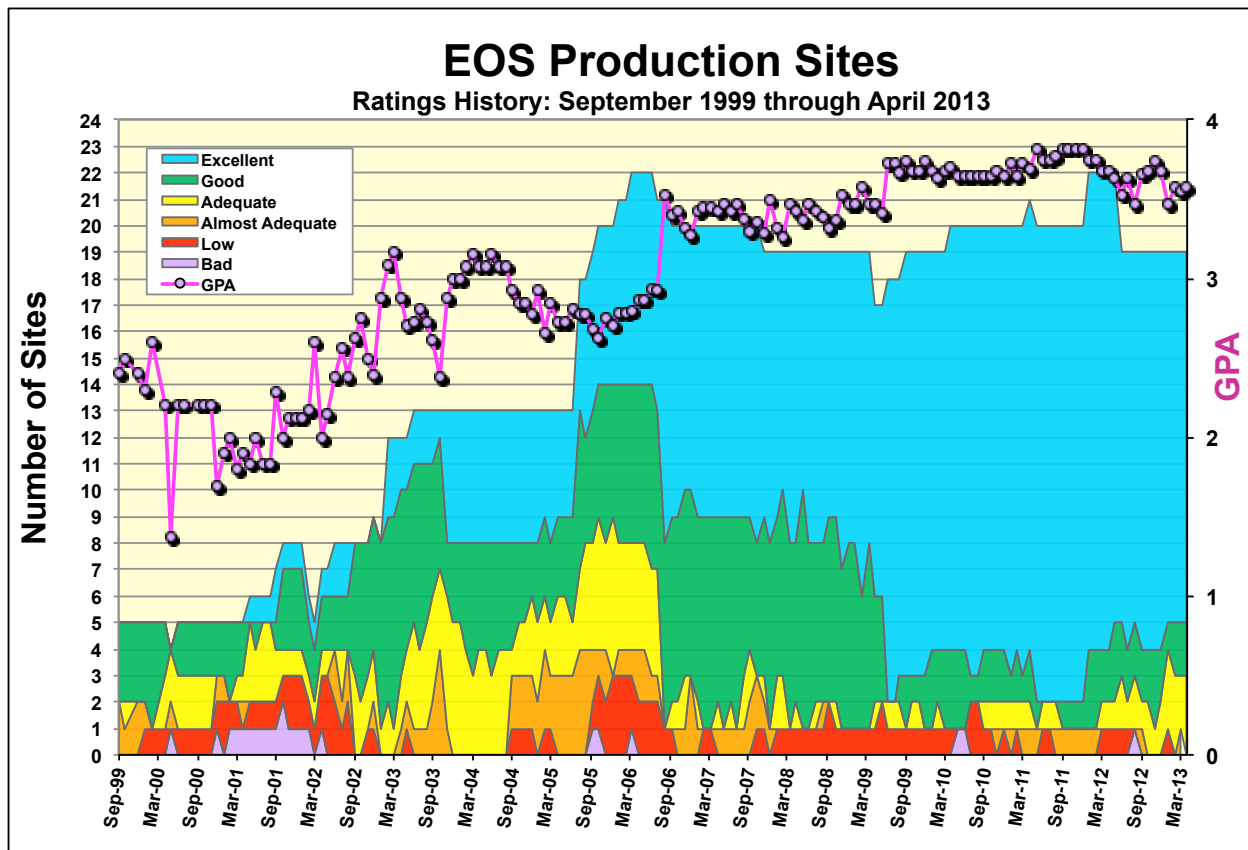
Ratings Categories:

Rating	Value	Criteria
Excellent:	4	Total Kbps > Requirement * 3
Good:	3	1.3 * Requirement <= Total Kbps < Requirement * 3
Adequate:	2	Requirement < Total Kbps < Requirement * 1.3
Almost Adequate:	1.5	Requirement / 1.5 < Total Kbps < Requirement
Low:	1	Requirement / 3 < Total Kbps < Requirement / 1.5
Bad:	0	Total Kbps < Requirement / 3

Where Total Kbps = Average Integrated Kbps (where available), otherwise just iperf

Note that "**Almost Adequate**" implies meeting the requirement excluding the usual 50% contingency factor.

Ratings History:



The chart above shows the number of sites in each rating category since EOS Production Site testing started in September 1999. Note that these ratings do NOT relate to absolute performance – they are relative to the EOS requirements.

Additions and deletions:

- 2011 April: Added RSS to GHRC
- 2011 May: Deleted WSC to ASF for ALOS
- 2012 January: Added NOAA → GSFC-SD3E
Added GSFC-SD3E → Wisconsin
- 2012 June: Deleted GSFC → LASP
Deleted GSFC ← → JAXA

Requirements Basis:

In June 2012, the requirements have been switched, as planned for quite a while, to use the EOSDIS network requirements database. EOSDIS has been reviewing its network ICD's with each of the instrument teams. These ICDs are now essentially completed, and the database has been updated with the ICD values, so those values are now used here.

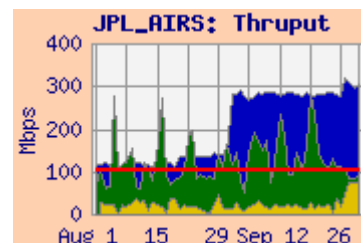
Previously, the requirements were based on the EOS Networks Requirements Handbook, Version 1.4.3 (from which the original database requirements were derived). Prior to that, the requirements were derived from version 1.4.2.

One main difference between Handbooks 1.4.2 and 1.4.3 is that in 1.4.3 most flows which occur less than once per day were averaged over their production period. These flows were typically monthly Level 3 data transfers, which were specified to be sent in just a few hours. However, they could easily be accommodated either between the per-orbit flows, or within the built-in contingency. Previously, these flows were added in linearly to the requirements, making the requirements unrealistically high.

Additionally, the contingency for reprocessing flows greater than 2X reprocessing was reduced. These flows WERE a major component of the contingency, so adding additional contingency on top of these flows was considered excessive.

Integrated Charts:

Integrated charts are included with site details, where available. These charts are “Area” charts, with a “salmon” background. A sample Integrated chart is shown here. The yellow area at the bottom represents the daily average of the user flow from the source facility (e.g., GSFC, in this example) to the destination facility (JPL, in this example) obtained from routers via “netflow”. The green area is stacked on top of the user flow, and represents the “adjusted” daily average iperf throughput between the source-destination pair most closely corresponding to the requirement. This iperf measurement essentially shows the circuit capacity remaining with the user flows active. Adjustments are made to compensate for various systematic effects, and are best considered as an approximation. The red line is the requirement for the flow from the source to destination facilities. On some charts a blue area is also present – usually “behind” the green area – representing adjusted iperf measurements from a second source node at the same facility.

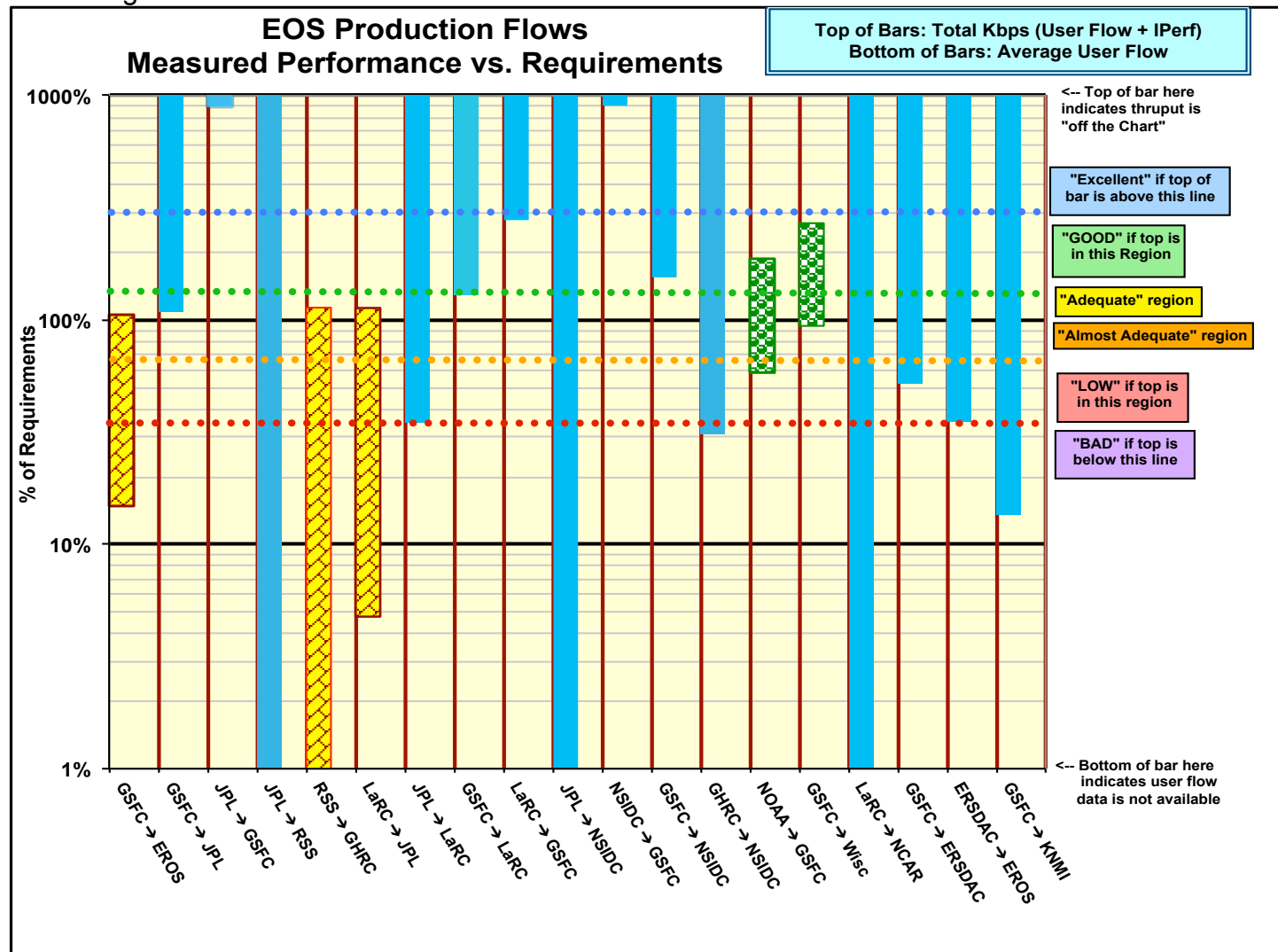


Network Requirements vs. Measured Performance

April 2013		Requirements (mbps)		Testing				Ratings	
Source → Destination	Instrument (s)	Current	Old	Source → Dest Nodes	Average User Flow mbps	iperf Median mbps	Integrated mbps	Ratings re Database Requirements	
		Database	HB 1.4.3+					This Month	Last Month
GSFC → EROS	MODIS, LandSat	548.4	342.9	MODAPS-PDR → EROS LPDAAC	81.3	552.5	579.4	Adequate	Adq
GSFC → JPL	AIRS, MLS, NPP, ISTs	63	116.7	NPP SD3E OPS2 → JPL-AIRS	68.9	755.2	765.5	Excellent	Ex
JPL → GSFC	MLS	0.57	0.6	JPL-PODAAC → GSFC GES DISC	8.1	162.0	164.6	Excellent	Ex
JPL → RSS	AMSR-E	0.16	0.5	JPL-PODAAC → RSS (Comcast)		7.6		Excellent	Ex
RSS → GHRC	AMSR-E	0.32	0.34	RSS (Comcast) → GHRC		0.36		Adequate	AA
LaRC → JPL	TES, MISR	83.5	69.3	LARC-ASDC → JPL-TES	4.0	94.6		Adequate	Adq
JPL → LaRC	TES	1.1	1.5	JPL-TES → LARC-PTH	0.38	130.3		Excellent	Ex
GSFC → LaRC	CERES, MISR, MOPITT, TES, MODIS	52.2	31.3	GSFC EDOS → LaRC ASDC	67.6	773.0	787.3	Excellent	Ex
LaRC → GSFC	MISR	0.6	0.4	LARC-ASDC → GES DISC	1.55	893.9	893.9	Excellent	Ex
JPL → NSIDC	AMSR-E	0.16	0.2	JPL-PODAAC → NSIDC		183.8		Excellent	Ex
NSIDC → GSFC	AMSR-E, MODIS, ICESAT	0.017	0.6	NSIDC DAAC → GES DISC	1.42	324.9	324.9	Excellent	Ex
GSFC → NSIDC	AMSR-E, MODIS, ICESAT	8.42	27.6	MODAPS PDR → NSIDC-DAAC	13.2	540.0	540.5	Excellent	Ex
GHRC → NSIDC	AMSR-E	0.46	0.5	GHRC → NSIDC DAAC	0.14	14.2		Excellent	Ex
NOAA → GSFC	NPP	522.3	615.6	NOAA-PTH → GSFC NPP-SD3E OPS1	304.8	918.5	980.1	Good	Good
GSFC → Wisc	NPP, MODIS, CERES, AIRS	259.1	253.7	GSFC NPP-SD3E OPS1 → WISC	244.2	650.5	700.5	Good	Adq
LaRC → NCAR	MOPITT	0.044	0.1	LaRC-PTH → NCAR		167.6		Excellent	Ex
GSFC → JAXA	TRMM, AMSR-E, MODIS	3.51	0.1	GSFC → JAXA	4.38	Testing discontinued: 31 March 2009		n/a	n/a
JAXA → GSFC	AMSR-E	0.16	0.1	JAXA → GSFC	1.54			n/a	n/a
GSFC → ERSDAC	ASTER	6.75	5.4	GSFC-EDOS → ERSDAC	3.5	187.9	187.9	Excellent	Ex
ERSDAC → EROS	ASTER	8.3	8.3	ERSDAC → EROS PTH	2.9	137.1	137.1	Excellent	Ex
GSFC → KNMI	OMI	13.4	0.03	GSFC-OMISIPS → KNMI ODPS	1.8	251.1	251.1	Excellent	Ex
		Significant change from HB v1.4.3 to Requirements Database							
		Value used for ratings							
						Ratings Summary		Database Req	
								Score	Prev
*Criteria:		Excellent				Excellent		14	14
		Good				Good		2	2
		Adequate				Adequate		3	2
		Almost Adequate				Almost Adequate		0	1
		Low				Low		0	0
		Bad				Bad		0	0
Notes:		Flow Requirements include:				Total Sites		19	19
		TRMM, Terra, Aqua, Aura, ICESAT, QuikScat, GEOS, NPP				GPA		3.58	3.55



This graph shows a bar for each source-destination pair – relating the measurements to the requirements for that pair. The bottom of each bar represents the average measured user flow from the source site to the destination site (as a percent of the requirement) – it indicates the relationship between the requirements and actual flows. Note that the requirements generally include a 50% contingency factor above what was specified by the projects, so a value of 67% (dotted orange line) would indicate that the project is flowing as much data as requested. The top of each bar similarly represents the integrated measurement, combining the user flow with Iperf measurements – this value is used to determine the ratings.



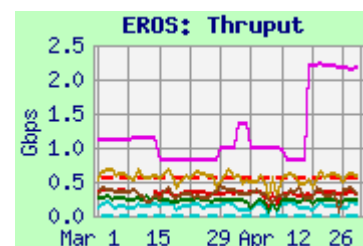
1) EROS:

Ratings: GSFC→ EROS: Continued **Adequate**
 ERSDAC→ EROS: Continued **Excellent**

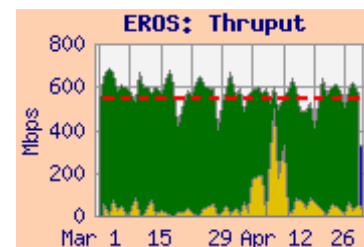
Web Page: <http://ensight.eos.nasa.gov/Organizations/production/EROS.shtml>
http://ensight.eos.nasa.gov/Organizations/production/EROS_PTH.shtml

Test Results:

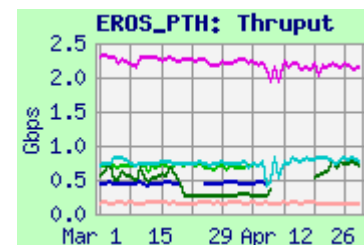
Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
MODAPS-PDR → EROS LPDAAC	693.5	552.5	259.4	81.3	579.4
GSFC-EDOS → EROS LPDAAC	259.3	226.6	37.1		
GES DISC → EROS LPDAAC	376.9	334.2	131.7		
GSFC-ENPL → EROS LPDAAC	1364.3	1339.6	996.7		
ERSDAC → EROS LPDAAC	205.2	137.1	32.7	2.93	137.1
NSIDC SIDADS → EROS PTH	538.3	326.5	85.8		
GSFC-ENPL → EROS PTH	2281.0	2173.3	1733.6		
GSFC-ENPL → EROS PTH (IPv6)	786.6	687.4	438.1		
GSFC-NISN → EROS PTH	860.1	768.3	407.9		
ESDIS-PS → EROS PTH	754.1	545.9	256.7		
ESDIS-PS → EROS PTH (IPv6)	460.5	452.5	368.0		
LaRC PTH → EROS PTH	180.4	161.2	106.4		

**Requirements:**

Source → Dest	Date	mbps	prev	Rating
GSFC → EROS	CY '12 -	548.4	343	Adequate
ERSDAC → EROS	FY '06 -	8.33	8.3	Excellent

**Comments:**

1.1 GSFC → EROS: The rating is based on the MODAPS-PDR Server to EROS LP DAAC measurement, since that is the primary flow. The requirement was increased 60% in June '12, switching to the requirements database, based primarily on increased MODIS reprocessing. There was a peak in user flow close to the requirement for about a week in early May, but the average this month is only about 15% of the new requirement (more than the typical 4.4% last month). The median integrated thrupt from MODAPS-PDR to LPDAAC remains above the requirement, with contingency, but by less than 30%, so the rating remains **Adequate**. Thrupt from GES DISC (also on EBnet) has been stable since late February, when the GES DISC firewall was upgraded.



The route from MODAPS-PDR is via EBnet, to the Doors, to the NISN 10 gbps backbone to the NISN Chicago CIEF, then via GigE, peering at the StarLight Gigapop with the EROS OC-48 tail circuit.

Iperf testing for comparison is performed from GSFC-ENPL to both LPDAAC (the "FTL" node, outside the EROS firewall) and to EROS-PTH (both 10 gig hosts) using both IPv4 and IPv6. The route from GSFC-ENPL to EROS is via a direct 10 gig connection to the MAX, to Internet2 to StarLight in Chicago. GSFC-ENPL (IPv4) to both EROS-FTL and EROS-PTH now typically gets over 2 gbps. This shows that the capacity of the network is in excess of the requirement – it would be rated **Excellent**. IPv6 tests appear limited below 1 gbps.

1.2 ERSD → EROS: **Excellent**. See section 9 (ERSD) for further discussion.

1.3 NSIDC → EROS-PTH: Performance has been noisy but stable since September.

1.4 LaRC → EROS: The thrupt from LaRC-PTH to EROS-PTH was very stable. The route is via NISN SIP to the Chicago CIEF to StarLight – similar to EBnet sources. Note that LaRC-PTH outflow is limited to 200 mbps by NISN at LaRC.

2) to GSFC**2.1) to NPP, GES DISC, etc.**Ratings: NOAA → NPP SD3E: Continued **Good**NSIDC → GES DISC: Continued **Excellent**LDAAC → GES DISC: Continued **Excellent**JPL → GSFC: Continued **Excellent**

Web Pages:

http://ensight.eos.nasa.gov/Missions/NPP/GSFC_SD3E.shtml<http://ensight.eos.nasa.gov/Organizations/production/GDAAC.shtml>http://ensight.eos.nasa.gov/Organizations/production/ESDIS_PTH.shtmlhttp://ensight.eos.nasa.gov/Missions/icesat/GSFC_ISIPS.shtml**Test Results:**

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
NOAA-PTH → NPP-SD3E-OPS1	938.9	918.5	842.5	304.8	980.1
EROS LPDAAC → GES DISC	231.6	187.7	48.9		
EROS PTH → GSFC-ESDIS PTH	625.8	462.4	179.8		
JPL-PTH → GSFC-ESDIS PTH	92.2	92.1	91.9	9.6	
JPL-TES → GSFC-NISN	546.5	279.7	41.0		
LaRC ASDC → GES DISC	924.4	893.9	403.0	1.5	
LARC-ANGe → GSFC-ESDIS PTH	936.8	936.1	920.9		
NSIDC DAAC → GES DISC	342.0	324.9	270.1	1.4	
NSIDC DAAC → GSFC-ISIPS (scp)	65.4	63.8	39.8		

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
NSIDC → GSFC	CY '12 –	0.017	0.6	Excellent
LaRC ASDC → GES DISC	CY '12 –	0.6	0.4	Excellent
JPL → GSFC combined	CY '12 –	0.57	3.2	Excellent
NOAA → NPP SD3E	CY '12 –	522.3	615.6	Good

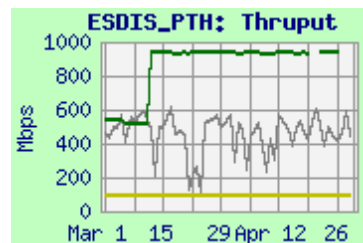
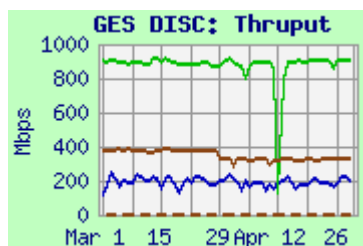
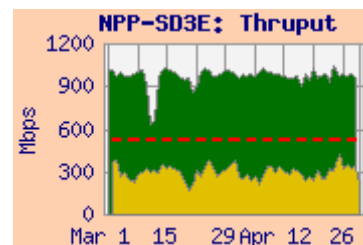
Comments:

NOAA → NPP-SD3E: Performance from NOAA-PTH to GSFC NPP-SD3E-OPS1 was very steady at over 900 mbps, limited by the gig-E interfaces on the NOAA side test machine (the circuits are all 10 gbps). User flow was steady, and close to the requirement (without contingency).

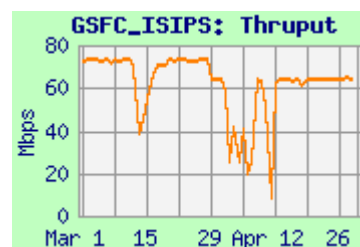
EROS LPDAAC, EROS-PTH → GSFC: The throughput for tests from EROS to GES DISC and from EROS-PTH to ESDIS-PTH were stable.

JPL → GSFC: Thruput from JPL-PTH is limited by the Fast-E interface on JPL-PTH. With the modest requirement the rating remains **Excellent**. The 9.6 mbps average user flow was well above last month's 3.9 mbps, also well above the old and new [reduced] requirement. Testing from JPL-TES to GSFC-NISN (not graphed) more clearly shows the capability of the network. Note that some JPL → GSFC flows take Internet2 instead of NISN, based on JPL routing policies.

LaRC → GSFC: Performance from LaRC ASDC to GES DISC was stable last month. Thruput from LaRC ANGe to ESDIS-PTH improved in mid March with increased window size and retuning. Both results remained way above 3 x the modest requirement, so the rating continues as **Excellent**. The user flow this month was again about 3 x the requirement.



NSIDC → GSFC: Performance from NSIDC to GES DISC was mostly stable, and was way above the tiny requirement; the rating remains **Excellent**. The user flow was again above the old requirement, and well above the new lower requirement. Thruput to GSFC-ISIPS using SCP (iperf testing still down after reconfiguration due to blocking) is lower than iperf previously, as expected, but is well above the requirement.



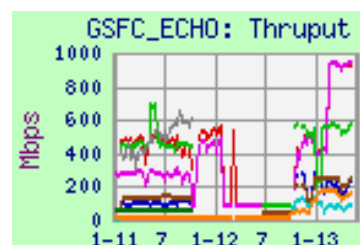
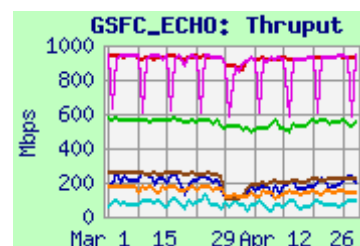
2.2 GSFC-ECHO: EOS Metadata Clearinghouse

Web Page:

http://ensight.eos.nasa.gov/Organizations/gsf/GSFC_ECHO.shtml

Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
EROS LPDAAC	239.7	177.0	66.0
EROS LPDAAC ftp	131.9	69.2	14.0
GES DISC	930.4	923.8	873.3
GES DISC ftp	935.7	922.2	536.9
LaRC ASDC DAAC	571.2	534.8	412.8
LaRC ASDC DAAC ftp	n/a	n/a	n/a
NSIDC DAAC	225.3	206.2	163.0
NSIDC DAAC ftp	161.0	140.4	73.1



Comments: Performance was mostly stable from all sites.

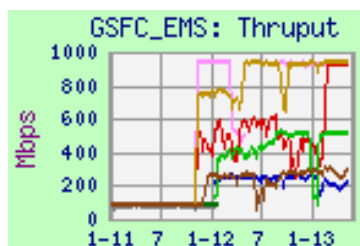
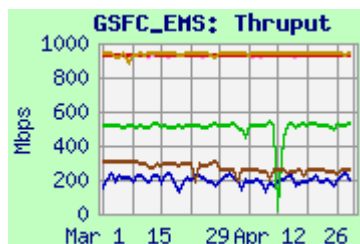
Thruput had improved dramatically from all sources in mid October 2012, when the ECHO firewall was replaced. Performance improved again from EROS and NSIDC in mid-December with retuning, and from GES DISC in March with the firewall upgrade. FTP performance is mostly limited by TCP window size – especially from sites with long RTT.

2.3 GSFC-EMS: EOS Metrics System

Web Page: http://ensight.eos.nasa.gov/Organizations/gsf/GSFC_EMS.shtml

Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
EROS LPDAAC	240.8	192.1	51.4
ESDIS-PTH	937.9	929.6	860.3
GES DISC	935.5	930.7	541.5
LARC ASDC	539.6	519.1	267.9
MODAPS-PDR	938.6	937.6	608.7
NSIDC-SIDADS	263.2	257.6	142.0



Comments: Testing is performed to GSFC-EMS from the above nodes, iperf only. The testing was transitioned to the new EMS test node (FS1) between November '11, and January '12 with much improved thruput. The performance limitation to the old server was its 100 mbps Fast-E connection; the new server is gigabit connected.

Performance was quite stable from all sources.

3) JPL:

3.1) GSFC → JPL:

Ratings: GSFC → JPL: Continued Excellent

Web Pages: http://ensight.eos.nasa.gov/Missions/aqua/JPL_AIRS.shtml
http://ensight.eos.nasa.gov/Missions/aura/JPL_MLS.shtml
http://ensight.eos.nasa.gov/Missions/NPP/JPL_SOUNDER.shtml
http://ensight.eos.nasa.gov/Organizations/production/JPL_QSCAT.shtml
http://ensight.eos.nasa.gov/Organizations/production/JPL_PODAAC.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GSFC-GES DISC → JPL-AIRS	262.7	253.0	215.2	68.9	261.1
NPP-SD3E-OPS2 → JPL-AIRS	825.5	755.2	494.9		
GSFC-NISN → JPL-AIRS	568.2	415.8	187.6		
ESDIS-PTH → JPL-AIRS	250.1	179.3	95.3		
NPP IDPS-Mini-inf → JPL-Sounder	126.4	99.1	59.3		
GSFC-NISN → JPL-MLS	381.1	305.3	193.7		
ESDIS-PTH → JPL-MLS	269.0	250.3	169.3		
ESDIS-PTH → JPL-PODAAC	79.2	68.5	43.4		
GSFC-NISN → JPL-PODAAC	136.1	93.1	40.9		
MODAPS-PDR → JPL-PODAAC	72.5	50.3	30.9		
GSFC-NISN → JPL-QSCAT	87.9	85.0	75.4		
ESDIS-PS → JPL-QSCAT	92.1	91.2	82.7		

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
GSFC → JPL Combined	CY '12-	63	116.7	Excellent
GSFC → JPL AIRS	CY '12-	40	98	Excellent
GSFC NPP → JPL Sounder	CY '12-	15	15	Excellent
GSFC → JPL MLS	CY '12-	1.0	2.1	Excellent

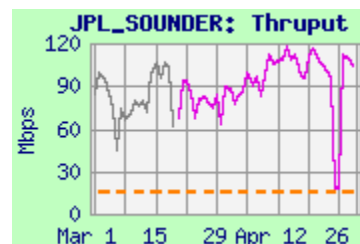
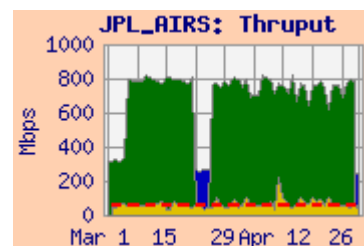
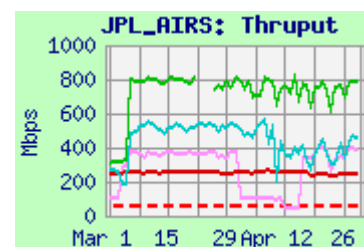
Comments:

AIRS , Overall: The requirements were switched in June '12 to use the requirements database, instead of the Handbook v1.4.3 previously. This resulted in a 46% decrease in the overall requirement.

The AIRS Integrated throughput improved from all sources on 5 March, due to increased window size on the AIRS server. The Integrated throughput from **GES DISC** remains above 3 x the reduced AIRS requirement, so the AIRS rating remains **Excellent**.

The **JPL overall rating** is based on the **NPP-SD3E-OPS2** to JPL AIRS throughput, compared with the sum of all the GSFC to JPL requirements. The median throughput remained above 3 x this requirement, so the overall rating remains **Excellent**. Note that the average user flow this month was a bit above the requirement (including contingency), and similar to last month.

NPP to JPL Sounder: Testing was switched from NPP IDPS-Mini to **NPP IDPS-Mini-inf** due to instability from NPP IDPS-Mini. Throughput to the JPL Sounder PEATE was mostly stable. The rating remains **Excellent**.

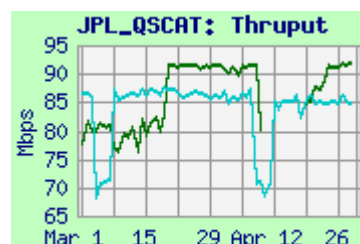
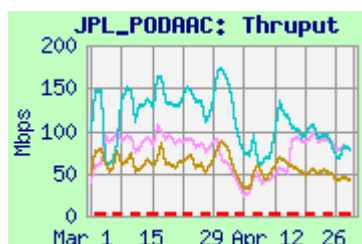
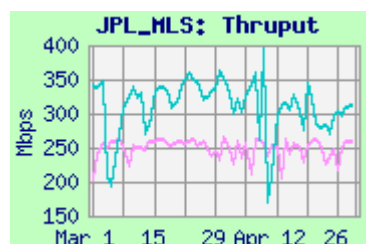


3.1) GSFC → JPL: continued

MLS: Thruput from both ESDIS-PTH and GSFC-NISN was mostly stable this month. Both were way above the modest requirement, so the rating remains **Excellent**.

PODAAC: There is no longer a requirement from GSFC to JPL PODAAC in the database. But thruput was way above the previous 1.5 mbps PODAAC requirement.

QSCAT: There is no longer a requirement from GSFC to JPL QSCAT in the database. Thuput from ESDIS-PS to QSCAT improved in March with retuning. It remains well above the modest previous 0.6 mbps requirement.

**3.2) JPL → LaRC**

Rating: Continued Excellent

Web Page: http://ensight.eos.nasa.gov/Organizations/production/LARC_PTH.shtml

Test Results:

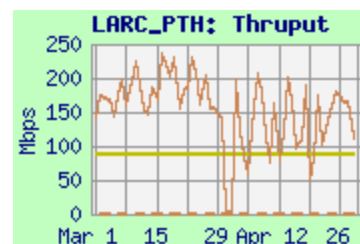
Source → Dest	Medians of daily tests (mbps)			User Flow
	Best	Median	Worst	
JPL-PTH → LaRC PTH	88.8	88.7	82.2	0.38
JPL-TES → LaRC PTH	277.8	130.3	31.0	

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
JPL → LaRC	CY '12 –	1.1	1.5	Excellent

Comment: This requirement is primarily for TES products produced at the TES SIPS at JPL, being returned to LaRC for archiving. The route from JPL to LaRC is via NISN PIP. This month the thruput from JPL-TES was again noisy but remained much higher than the requirement; the rating remains **Excellent**. The user flow this month was similar to last month, and below the requirement.

Thruput from JPL-PTH to LaRC-PTH switched from the lower of its two common states (60 mbps), to the higher state (88 mbps) in mid January 2013. It is limited by a Fast-E interface on JPL-PTH.



3.3) LaRC → JPL**Rating: Continued Adequate**

Web Pages:

http://ensight.eos.nasa.gov/Organizations/production/JPL_TES.shtmlhttp://ensight.eos.nasa.gov/Missions/terra/JPL_MISR.shtmlhttp://ensight.eos.nasa.gov/Organizations/production/JPL_PTH.shtml**Test Results:**

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
LaRC ASDC → JPL-MISR	80.7	77.1	44.8	4.0	77.1
LaRC PTH → JPL-MISR	77.0	71.5	56.6		
LaRC ASDC → JPL-TES	101.5	94.6	59.5	0.9	
LaRC ANGE → JPL-TES	418.2	325.8	229.5		
LaRC PTH → JPL-TES	178.2	164.9	122.9		
LaRC PTH → JPL-TES sftp	26.4	25.6	10.9		
LaRC ANGE → JPL-PTH	87.6	86.0	79.8	12.5	

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
LaRC → JPL-Combined	CY '12 –	83.5	69.3	Adequate
LaRC ASDC → JPL-MISR	CY '12 –	78.1	62.3	Almost Adq
LaRC ASDC → JPL-TES	CY '12 –	5.5	7.0	Excellent

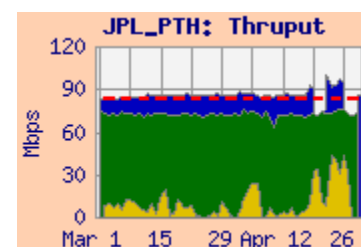
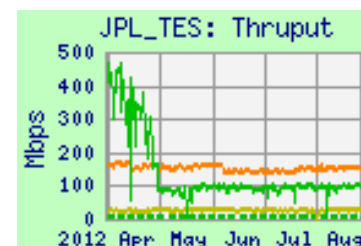
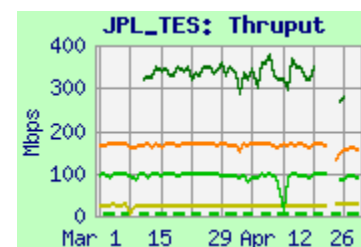
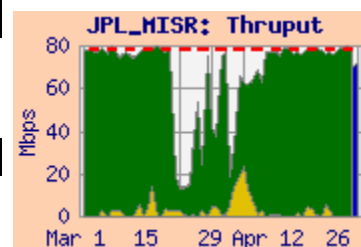
Note: Performance from LaRC ASDC to JPL (also from LaRC ASDC to most other destinations) was very variable (typically on a 3 hour cycle), beginning at the end of April 2012, apparently due to congestion at ASDC. After mid July, the 3 hour cycle disappeared, but the thrupt from LaRC ASDC stayed low and has often been noisy – and sometimes stable. Performance from LaRC ANGe and LaRC PTH to JPL was stable and did not exhibit this characteristic.

LaRC → JPL (MISR): LaRC ASDC to JPL MISR thrupt is limited by the Fast-E connection to the MISR node, and the ASDC congestion. User flow was much lower than the requirement. The median integrated thrupt remains slightly below the MISR requirement, so the MISR rating remains **Almost Adequate**.

LaRC → JPL (Overall, TES): Median performance from LaRC ASDC DAAC to JPL-TES dropped way down at the end of April 2012, due to the congestion above. The median thrupt remained well over 3 x the TES requirement, so the TES rating remains **Excellent**. Thrupt stabilized in late January, and remained above the combined requirements, so the Overall rating remains **Adequate**. User flow to TES is very low.

The JPL-PTH integrated graph shows the overall LaRC to JPL user flow (vs. the overall requirement).

The true capacity of the network is better seen with the LaRC ANGe → JPL-TES thrupt (added last month), which is not subject to the ASDC congestion. The Overall rating based on this test would be **Excellent**. Performance from LaRC PTH to JPL-TES is stable, better than from LaRC ASDC, but is limited to 200 mbps by NISN.



4) GSFC → LaRC:**Rating: Continued Excellent**

Web Pages : <http://ensight.eos.nasa.gov/Organizations/production/LARC.shtml>
http://ensight.eos.nasa.gov/Organizations/production/LARC_ANGe.shtml
http://ensight.eos.nasa.gov/Organizations/production/LARC_PTH.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GES DISC → LaRC ASDC	935.3	913.7	599.3	67.6	922.0
GSFC-EDOS → LaRC ASDC	862.3	773.0	175.7		
ESDIS-PTH → LaRC-ANGe	907.5	880.2	518.6		
GSFC-NISN → LaRC-ANGe	867.7	825.7	739.3		

Requirements:

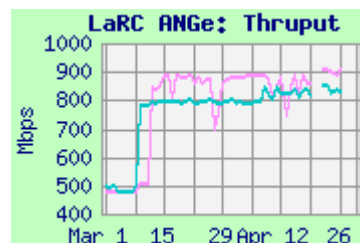
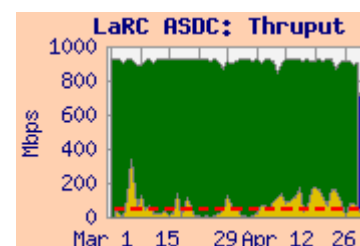
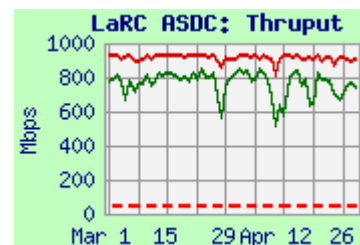
Source → Dest	Date	Mbps	Prev	Rating
GSFC → LARC (Combined)	CY '12 –	52.2	31.3	Excellent

Comments:

GSFC → LaRC ASDC: Thruput from GES DISC to LaRC ASDC DAAC remained well above 3 x the increased combined requirement, so the rating remains **Excellent**. Thruput to ASDC from GSFC-EDOS was noisy but stable.

As seen on the integrated graph, the user flow was above both normal and the requirement this month (was 45 mbps last month).

ANGe (LaTIS): Testing to ANGe ("Bob") from ESDIS-PTH improved last month due to increased window size and retuning, and was similar to performance from GSFC-NISN.



5) Boulder CO sites:

5.1) NSIDC:

Ratings: GSFC → NSIDC: Continued **Excellent**
 JPL → NSIDC: Continued **Excellent**
 GHRC → NSIDC: Continued **Excellent**

Web Pages: <http://ensight.eos.nasa.gov/Organizations/production/NSIDC.shtml>
http://ensight.eos.nasa.gov/Organizations/production/NSIDC_SIDADS.shtml
http://ensight.eos.nasa.gov/Organizations/production/NSIDC_PTH.shtml

Test Results: NSIDC S4PA

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
MODAPS-PDR → NSIDC DAAC	544.6	540.0	402.3	13.2	540.5
GES-DISC → NSIDC DAAC	433.5	432.7	387.8		
GSFC-EDOS → NSIDC DAAC	137.7	136.0	33.2		
ESDIS-PTH → NSIDC DAAC	532.1	530.7	492.1		
GSFC-ISIPS → NSIDC (iperf)	119.2	117.2	99.3		
JPL PODAAC → NSIDC DAAC	196.4	183.8	112.7		
GHRC → NSIDC DAAC (nuttcp)	30.4	14.2	5.6		
GHRC → NSIDC DAAC (ftp pull)	53.3	27.2	3.6		

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
GSFC → NSIDC	CY '12 –	8.42	27.6	Excellent
JPL → NSIDC	CY '12 –	0.16	0.2	Excellent
GHRC → NSIDC	CY '12 –	0.46	0.5	Excellent

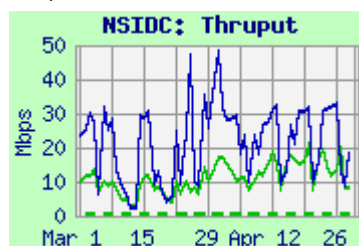
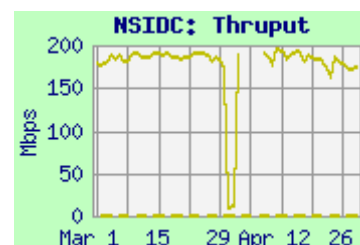
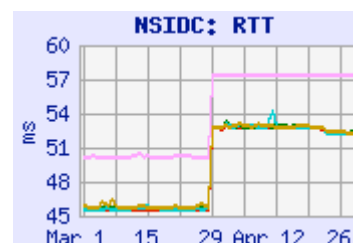
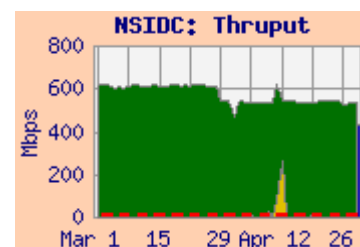
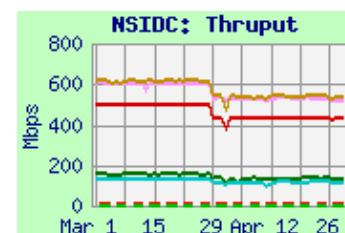
Comments: GSFC → NSIDC S4PA: Thruput from all sources dropped about 10% in late March, due to increased RTT.

The rating is based on testing from the MODAPS-PDR server to the NSIDC DAAC. The requirement was reduced in May '09 from 34.5 mbps (and was 64 mbps in April '08). The integrated thuput from MODAPS-PDR remains well above 3 x the requirement, so the rating remains **Excellent**. The 13.2 mbps average user flow was above typical and the requirement, due to an exceptional burst.

JPL PODAAC → NSIDC S4PA: The requirement was reduced from 1.34 mbps in May '09. Thruput from PODAAC to NSIDC improved dramatically in mid December, and has been mostly stable since then; the rating remains **Excellent**.

GHRC, GHRC-ftp → NSIDC S4PA: GHRC (NSSTC, UAH,

Huntsville, AL) sends AMSR-E data to NSIDC via NLR / Internet2. The median thuput remained well above 3 x the 0.46 mbps requirement, so the rating remains **Excellent**. User flow averaged 144 kbps this month, about 31% of the requirement.

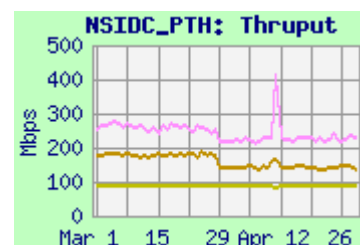
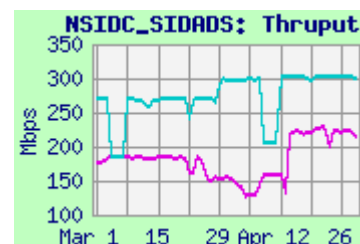


5) Boulder CO sites (Continued):**5.1) NSIDC:** (Continued):**Test Results: NSIDC SIDADS, NSIDC-PTH**

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
GSFC-ENPL → NSIDC-SIDADS	229.4	215.8	140.8
GSFC-NISN → NSIDC-SIDADS	303.3	301.8	272.5
ESDIS-PTH → NSIDC-PTH	285.8	226.5	171.1
MODAPS-PDR → NSIDC-PTH	196.8	141.9	125.8
JPL PTH → NSIDC-PTH	89.1	89.0	74.1

GSFC → NSIDC-SIDADS: The performance to from GSFC to NSIDC-SIDADS improved in mid April via both NISN and Internet2 (note expanded scale on graph).

NSIDC-PTH: Thruput from both GSFC sources dropped about 10% (similar to thruput to NSIDC DAAC), due to RTT increase. Thruput from JPL was very stable this month.

**5.2) LASP:**Ratings: LASP → GSFC: Continued **Excellent**

Web Page: <http://ensight.eos.nasa.gov/Organizations/production/LASP.shtml>

Test Results:

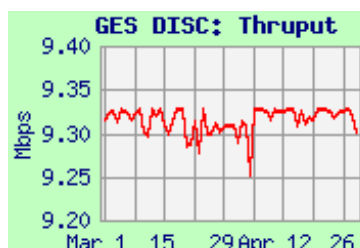
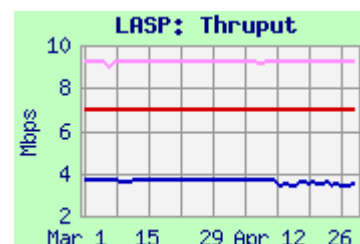
Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
ESDIS-PTH → LASP blue (scp)	3.70	3.55	3.08
ESDIS-PTH → LASP blue (iperf)	9.30	9.26	8.64
GES DISC → LASP blue (iperf)	6.95	6.95	6.05
LASP → GES DISC	9.33	9.33	9.25

Requirement:

Source → Dest	Date	Mbps	Rating
LASP → GES DISC	CY '10 -	0.016	Excellent

Comments: In January '11, LASP's connection to NISN PIP was rerouted: it previously was 100 mbps from CU-ITS via NSIDC; this was changed to a 10 mbps connection to the NISN POP in Denver.

Iperf testing from **GES DISC** improved and stabilized in mid February, with the GES DISC firewall upgrade. Iperf and SCP testing from **ESDIS-PTH** was very stable, and consistent with the circuit limitation. Return testing from LASP to GES DISC was also very stable, rating **Excellent**.

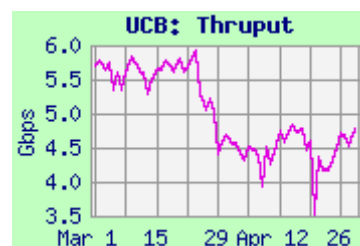
**5.3) UCB:**

Web Page: <http://ensight.eos.nasa.gov/Organizations/daac/UCB.shtml>

Test Results:

Source	Medians of daily tests (gbps)		
	Best	Median	Worst
GSFC-ENPL-10G	5.0	4.5	3.0

Comments: Testing is to a 10 gig connected test node at UCB. The route is via Internet2 to FRGP, similar to NCAR. Thruput dropped about 10% in late March, due to RTT increase (similar to thruput from GSFC to NSIDC DAAC).



5.4) NCAR:

Ratings: LaRC → NCAR: Continued **Excellent**
 GSFC → NCAR: Continued **Excellent**

Web Pages <http://ensight.eos.nasa.gov/Missions/terra/NCAR.shtml>

Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
LaRC PTH	182.3	167.6	144.5
GSFC-ENPL-10G	4579.0	2930.2	633.9
GSFC-ENPL-FE	94.5	94.2	93.6
GSFC-NISN	790.4	618.3	377.3

Requirement:

Source	Date	Mbps	Prev	Rating
LaRC	CY '12 -	0.044	0.1	Excellent
GSFC	CY '12 -	0.111	5.0	Excellent

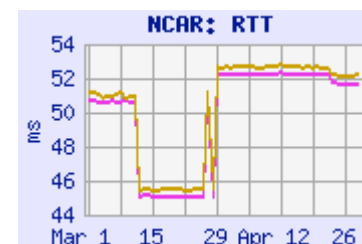
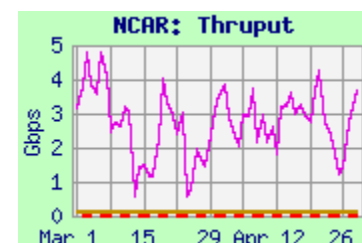
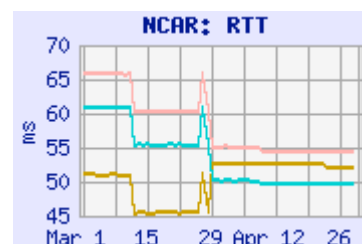
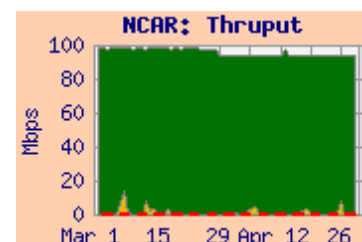
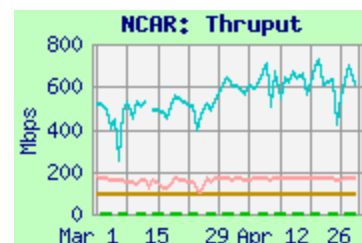
Comments: NCAR has a SIPS for MOPITT (Terra, from LaRC), and has MOPITT and HIRDLS (Aura, from GSFC) QA requirements.

Testing was switched to NCAR's 10 gigabit capable PerfSonar server in March '12 – testing was discontinued from LaRC ASDC at that time; testing from LaRC-PTH continued.

From LaRC: Thruput from LaRC-PTH was well above 3 x the modest requirement, so the rating remains **Excellent**. Note that outflow from LaRC-PTH is limited to 200 mbps by NISN.

From GSFC: From GSFC-NISN, the route is via NISN to the MAX (similar route as from LaRC-PTH). The RTT from these NISN sources actually dropped this month, unlike GSFC to Boulder via Internet2 / NLR. Thruput remained noisy this month, but stable, and well above 3 x the requirement, so the rating remains **Excellent**. The average user flow from GSFC this month was 1.1 mbps, close to usual, but about 10x the revised requirement.

From GSFC-ENPL-10G, with a 10 Gig-E interface, and a 10 gig connection to MAX, performance to NCAR's 10 Gig PerfSonar node is noisy, but gets close to 4 gbps on peaks. Thruput dropped a bit in April, due to an increase in RTT (similar to thruput from GSFC to other Boulder sites).



6) Remote Sensing Systems (RSS):

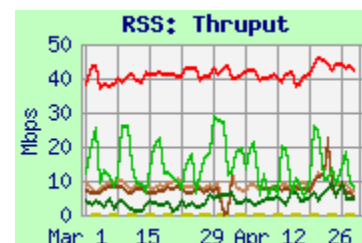
Ratings: JPL → RSS: Continued **Excellent**

RSS → GHRC: ↑ **Almost Adequate** → **Adequate**

Web Page <http://ensight.eos.nasa.gov/Missions/aqua/RSS.shtml>

Test Results:

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
JPL PODAAC → RSS (Comcast)	12.4	7.6	2.8
JPL TES → RSS (Comcast)	11.5	8.6	2.5
GSFC-NISN → RSS (Comcast)	44.0	41.7	33.4
GHRC-UAH → RSS (Comcast)	33.7	11.8	0.8
GHRC-NISN → RSS (Comcast)	17.7	4.6	1.7
RSS (Comcast) → GHRC (UAH)	0.82	0.36	0.24
RSS (Comcast) → GHRC (NISN)	0.99	0.38	0.24



Requirements:

Source → Dest	Date	Mbps	Prev	Rating
JPL PODAAC → RSS	CY '12 -	0.16	0.49	Excellent
RSS → GHRC	CY '12 -	0.32	0.34	Good

Comments: RSS (Santa Rosa, CA) is a SIPS for AMSR-E (Aqua), receiving L1 data from JAXA via JPL, and sending its processed L2 results to GHRC (aka NSSTC) (UAH, Huntsville, AL).

RSS → GHRC: At the end of March '12, RSS switched its production node from the NISN SIP circuit (4 x T1s to NASA ARC -- total 6 mbps) to the Comcast circuit, rated at 50 mbps incoming, and 12 mbps outgoing (installed in April 2011). Testing via the NISN circuit to RSS was discontinued at that time.

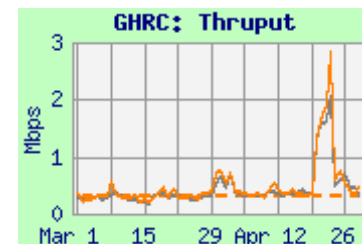
It appears that the peering between JPL and Comcast degraded again in March. It had mostly recovered in early February -- after degrading at the end of December. The route from JPL is via Los Nettos, CENIC, peering with Comcast in LA.

Testing from the UAH server at GHRC was noisy but stable, with significant diurnal variation. Testing from the NISN server at GHRC was noisy and lower than from UAH.

The median iperf from JPL remained well above 3 x the reduced requirement, so the rating from JPL remains **Excellent**.

RSS → GHRC: The servers at RSS on the Comcast circuit allow "3rd party" testing, as does the server at GHRC. Testing is therefore performed between RSS and GHRC, both with a UAH address and a NISN address at GHRC.

The results to the two destinations are very similar; both dropped severely in early January, but recovered to their previous noisy state in early February, then stabilized at a lower level in March. The performance from both sources is now slightly above the requirement, so the rating improves to **Adequate**.



7) Wisconsin:Web Pages <http://ensight.eos.nasa.gov/Missions/NPP/WISC.shtml>Rating: Continued **Good****Test Results:**

Source Node	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
NPP-SD3E	712.0	650.5	459.7	244.1	700.5
GES DISC	660.8	616.6	463.0		
GSFC ENPL	1225.0	1061.5	376.4		
LaRC ANGe	407.6	406.6	218.2		

Requirements:

Source Node	Date	mbps	Prev	Rating
NPP-SD3E	CY'12 -	237.2	237.2	Good
GSFC MODAPS	CY'12 -	21.9	16.5	Excellent
GSFC Combined	CY'12 -	259.1	253.7	Good
LaRC Combined	CY'12 -	n/a	7.9	Excellent

Comments: The University of Wisconsin is included in this Production report due to its function as Atmosphere PEATE for NPP. Wisconsin continues to be an SCF on the MODIS, CERES and AIRS teams.

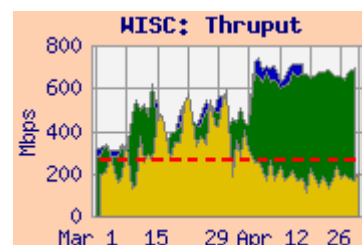
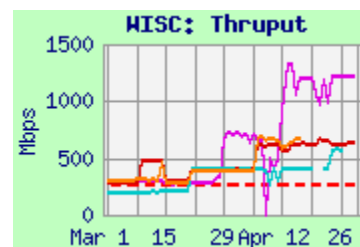
GSFC: Thruput to Wisconsin changed several times in March and April. In early March, additional streams were added from NPP-SD3E and GES DISC to try to get thrupt significantly above the requirement – in spite of small windows on the Wisconsin server. Then, on March 15, the route from EBnet to Wisconsin changed, increasing RTT – and thus reducing thrupt. On March 20, the number of streams was further increased from NPP-SD3E and GES DISC, increasing thrupt again.

At the end of March, testing from GSFC-ENPL was switched to a new 10 gig server at Wisconsin (SSEC), with much improved thrupt. This testing was retuned (increased window size on the Wisc server) in mid April, with further improvement – now above 1 gbps.

User flow was high, and close to the requirement, but lower than previously. The integrated thrupt from NPP-SD3E was above the NPP requirement by more than 30% (but slightly less than 3x), so the NPP rating is **Good**. It was also above the GSFC combined requirement by more than 30%, so that rating remains **Good**.

The route from EBnet at GSFC is via MAX to Internet2, peering with MREN in Chicago.

LaRC: There is no longer a CERES requirement from LaRC to Wisconsin. On March 20, the number of streams was further increased from LaRC ANGe, increasing thrupt. On 23 April, testing from LaRC ANGe was switched to the new SSEC 10 gig server; performance improved at that time. Thrupt from LaRC ANGe is well above the previous 7.9 mbps requirement, and would be rated **Excellent**. The route from LaRC is via NISN, peering with MREN in Chicago.



8) KNMI:Rating: Continued **Excellent**Web Pages http://ensight.eos.nasa.gov/Missions/aura/KNMI_ODPS.shtml**Test Results:**

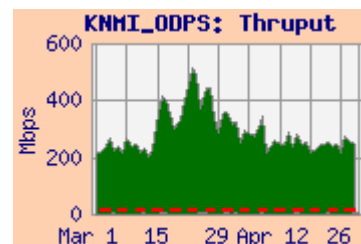
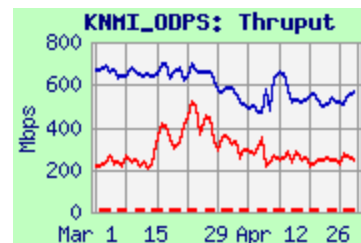
Source → Dest	Medians of daily tests (mbps)			
	Best	Median	Worst	Reqmt
OMISIPS → KNMI-ODPS	496.1	251.1	122.6	13.4
GSFC-ENPL → KNMI-ODPS	681.1	522.5	323.5	

Comments: KNMI (DeBilt, Netherlands) is a SIPS and QA site for OMI (Aura). The route from GSFC is via MAX to Internet2, peering in DC with Géant's 2 x 10 gbps circuit to Frankfurt, then via Surfnets through Amsterdam.

The requirement was increased with the use of the database to 13.4 mbps, a much more realistic value than the previous 0.03 mbps.

The rating is based on the results from OMISIPS at GSFC to the ODPS primary server at KNMI. Thruput from OMISIPS (on EBnet) has been mostly stable. The median thruput remains much more than 3 x the increased requirement, so the rating remains **Excellent**.

The user flow, however, averaged only 1.8 mbps this month, similar to March, well below the requirement.



9) JSpace - ERSD:

Ratings: **GSFC → ERSD: Continued Excellent**
ERSD → EROS: Continued Excellent
ERSD → JPL-ASTER-IST: N/A

Web Page: <http://ensight.eos.nasa.gov/Organizations/production/ERSDAC.shtml>

US ↔ JSpace - ERSD Test Results

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GSFC-EDOS → ERSD	354.6	187.9	17.9	3.5	187.9
GES DISC → ERSD	62.6	61.0	54.3		
GSFC ENPL (FE) → ERSD	91.0	90.2	87.1		
GSFC ENPL (GE) → ERSD	451.5	352.2	233.4		
ERSD → EROS	205.2	137.1	32.7	2.9	137.1
ERSD → JPL-ASTER IST	n/a	n/a	n/a		
ERSD → JPL-TES	163.2	111.4	56.0		

Requirements:

Source → Dest	CY	Mbps	Prev	Rating
GSFC → ERSD	'12 -	6.75	5.4	Excellent
ERSD → JPL-ASTER IST	'12 -	0.31	0.31	Excellent
ERSD → EROS	'12 -	8.33	8.3	Excellent

Comments: **GSFC → ERSD:** As of approximately September '11, the ERSD test node is connected at 1 gbps – it was previously 100 mbps. The median throughput from most nodes improved at that time. Peak throughput from **GSFC ENPL** is often over 500 mbps.

Some nodes, however, (e.g., EDOS) had been using QoS (HTB) to reduce loss previously seen in the 1 gig to 100 meg switch at Tokyo-XP – so it initially remained limited by its HTB settings, and did not see much improvement. The EDOS HTB settings were raised in February, resulting in much higher average performance, although it was also very noisy.

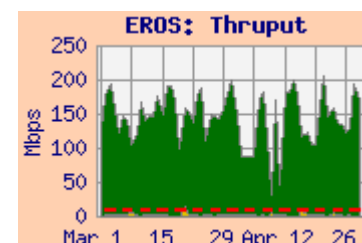
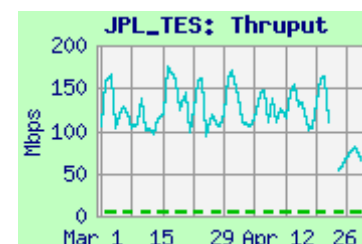
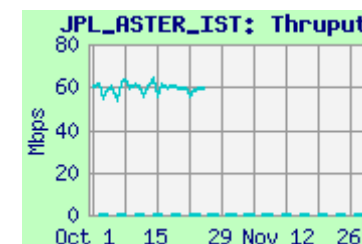
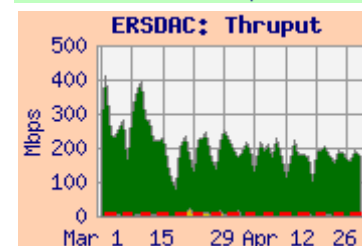
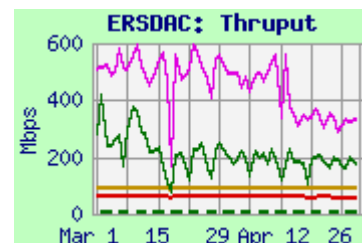
Throughput from **GES DISC** stabilized and improved in mid February, due to the GES DISC firewall replacement.

Throughput remains well above 3 x the reduced requirement, so the rating remains **Excellent**. The user flow was close to normal this month, in both directions (after a burst last month), and remains consistent with the requirement.

The FastE connected **GSFC-ENPL-FE** node is limited to 100 mbps by its own interface, and gets very steady throughput.

ERSD → JPL-ASTER-IST: The JPL-ASTER-IST test node was retired in October; a replacement node is being sought. As a substitute, testing was initiated from ERSD to a different node at JPL ("TES"). Results to TES are better than previously to the JPL-ASTER-IST, and would be rated **Excellent**.

ERSD → EROS: The throughput improved with retuning in October '11, after the ERSDAC Gig-E upgrade; it remains well above the reduced requirement (was 26.8 mbps previously). The user flow was near normal this month. The median throughput is more than 3 x the reduced requirement, so the rating remains **Excellent**.



10) US \leftrightarrow JAXARatings: US \rightarrow JAXA: N/AJAXA \rightarrow US: N/A

The JAXA test hosts at EOC Hatoyama were retired on March 31, 2009 (the end of the Japanese government's fiscal year). No additional testing is planned for AMSR or TRMM. [All testing to JAXA-TKSC for ALOS was terminated at the end of June '09.](#) JAXA has been requested to restore these tests – in preparation for GPM -- but they have declined to participate.

However, the user flow between GSFC and JAXA continues to be measured. As shown below, the user flow this month averaged 4.38 mbps from GSFC to JAXA, and 1.54 mbps from JAXA to GSFC. This is very similar to last month.

These values are more or less consistent with the new (database) requirements of 3.36 mbps to JAXA, and 1.31 mbps back to JPL. However, since no iperf tests are run, the true capability of the network cannot be determined, and therefore no rating is assigned. But since the user flow in both directions exceeds the corresponding requirement, the rating would be at least "Adequate"

